REMARKS

Applicants have carefully considered the Office Action dated June 20, 2005 and the references cited therein. Applicants respectfully submit that this Amendment places the application in condition for allowance. Accordingly, reconsideration is respectfully requested.

In this Amendment Claims 2, 21 and 28 have been cancelled without prejudice and new Claim 31 has been added. Accordingly, Claims 1, 3-20, 22-27, and 29-31 are presented for consideration.

In the Office Action, the Examiner has indicated that Claim 7 would be allowed if rewritten in independent form including all the limitations of the base claim and any intervening claims. Applicants gratefully acknowledge this indication of allowable subject matter. New Claim 31 has been added which includes the features of Claim 1 and Claim 7. Accordingly, Applicants respectfully submit that new Claim 31 patentably distinguishes over the references of record.

Claims 20-28 have been rejected under 35 U.S.C. § 102(e) as being anticipated by U.S. Patent Publication No. 2003/0061004 to Discenzo ("Discenzo"). The Examiner contends that Discenzo teaches an apparatus for determining the operational status of a cycle fluid power system including a sensor for sensing a system characteristic wherein the characteristic is the flow rate. The Examiner also contends that Discenzo further discloses a calculating unit for performing mathematical integration on the system characteristics to

determine diagnostic value and comparing the value to a predetermined value to determine system performance.

With regard to Claim 22, the Examiner contends that Discenzo teaches the diagnostic value of being determined upon a flow rate signal.

Applicants have amended Claim 20 in order to further define the system characteristic as the flow rate. Consequently, Claim 21, which includes this feature, has been cancelled. Claim 20 has been further amended to define the operational status as the service life of the system.

Claim 20 as amended defines an apparatus for determining an operational status of a cyclic fluid power system. The claim defines a sensor for sensing a system characteristic and a calculating unit operatively connected to the sensor. The calculating unit includes circuitry for performing a mathematical integration on the flow rate to determine the diagnostic value and compares the diagnostic value to a predetermined value to determine the service life status of the system. A notification device is operatively connected to the calculating unit for indicating the service life status of the system.

Applicants respectfully submit that Discenzo does not teach an apparatus that determines the service life of a fluid power system by integrating the flow rate of the system. Discenzo teaches determining optimal performance of a pump in order to minimize energy costs. See ¶¶ 84-94. There is no teaching to use the flow rate to determine the service life of the system. Information such as expected failure rates are additional parameters that may be

incorporated into an operational model for determining optimization. See ¶ 86. However, there is no teaching on how additional parameters such as expected failure rates are to be determined. The mathematical integration disclosed in paragraphs 88 to 91, is not teaching integration of the flow rate to determine the service life of the cyclic system. Instead, these formulas are used to determine optimization of a system.

Discenzo fails to teach or suggest a calculating unit that integrates flow rate to determine service life of the cyclic system. Therefore, Applicants respectfully submit that Claim 20, as amended, patentably distinguishes over the references of record.

Applicants have amended Claim 27 in order to include the features of Claim 28, which is now cancelled. Claim 27, as amended, defines the mathematical integration of the flow rate over time in order to obtain a characteristic value. Claim 27 has been amended to further define the performance status as being the service life status of the cyclic system. As set forth above with respect to amended Claim 20, Applicants respectfully submit that Discenzo does not disclose differentiating the flow rate over time in order to determine a service life status of the cyclic system. Accordingly, Applicants respectfully submit that Claim 27 and those claims depending therefrom patentably distinguish over the references of record.

In the Office Action, Claims 1-19, 29 and 30 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Discenzo in view of U.S. Patent No. 6,131,609 to Metso, et al. ("Metso"). With regard to Claims 1-3, 13, 14 and 16 the Examiner contends that Discenzo teaches each of the elements but does not specify determining a cycle time. For this reason the Examiner relies on Metso for teaching a method of diagnosing a fluid valve in

which a cycle time is determined when calculating a diagnostic value as set forth in Column 5, Lines 5-9. The Examiner contends that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Discenzo so that the cycle time could be determined as in Metso in order to improve determination of efficiency of cyclic systems.

Applicants have amended Claim 1 to include the features of Claim 2, which has now been cancelled. Claim 1, as amended, defines a method for determining the service life of a fluid power cyclic system including the steps of determining at least one characteristic of the system to determine a characteristic value determining a cycle time of the cyclic system. The characteristic value is the flow rate. The flow rate is applied to an algorithm in which the flow rate is integrated over the cycle time in order to determine a diagnostic value. This diagnostic value is compared to a predetermined value to determine the service life status of the cyclic system.

A cycle is a periodically repeating sequence of events. The present invention as is directed to a cyclic fluid power system having repeatable cycles. Page 5, Lines 22-23. In a fluid power cyclic system, the actions of the valves and actuators comprising the system are repeated in each cycle. The operation of most processing machines, i.e., packaging machines, printing machines, assembly machines, etc. are cyclic. The actions of the actuators are repeated invariably over and over again. In such cyclic systems, variation in a system parameter between cycles provides useful information in determining the function of the system. Such information, such as flow rate, can be used in order to determine the service life of the components of the system.

Applicants respectfully submit that the cited prior art fails to disclose each and every element of Claim 1 as amended. Neither Discenzo nor Metso disclose a fluid power cyclic system. The repeatability of actions for each cycle which defines a cyclic system is not present in these references. In Discenzo, the objective is to control systems to optimize performance characteristics. ¶ 50. The diagnosis of a cyclic system is fundamentally different because the technical process is repeated continually which allows new methods of diagnosis by comparing data from different times. They are all comparable because of their identical process for diagnosis. Such possibilities are not taught or suggested in Discenzo.

Metso is also not related to a cyclic system since the valve control process depends on the stroke of the positioner and this stroke is variable depending on the control task. Therefore, Metso needs to define the measuring interval arbitrarily. Col. 5, Lines 5-21. There is no repeatable action.

Furthermore, the references of record fail to teach or suggest using an integral of the flow rate to determine the cycle life of a system. As set forth above with respect to Claim 20, Discenzo does not use the flow rate in order to determine diagnostic information relating to service life. Discenzo is directed to system optimization and the integrations of values disclosed therein are for that purpose. Information such as expected failure rates are parameters that are that are added to an operational model. There is no teaching to integrate the flow in order to obtain diagnostic information related to the service live of the system.

The Metso patent also fails to disclose the use of a flow integral in order to determine a system characteristic. Metso teaches monitoring various parameters of the valve including the position information, the difference between the input and output pressure, the control signal and the level of the pressure of the positioner. As set forth in column 3, lines 12-20, these values and the changes are compared with the deduction rules formed from Boolean

rules. Based on this comparison the condition of the control valve is noted and, if necessary, alerts are given. There is no teaching or suggestion to integrate the flow rate as defined in Claim 1.

Accordingly, Applicants respectfully submit that the cited references, either alone or in combination, do not teach each and every limitation of amended Claim 1. Therefore, Claim 1 patentably distinguishes over the references of record.

In addition, Applicants respectfully urge that one skilled in the art would not combine the references as suggested by the Examiner. Metso discloses a system in which the stroke length of a positioner is variable depending on the control task. Therefore, Metso needs to determine the measuring interval arbitrarily (See Column 5, Line 5 to 23 and Figure 2). Consequently, Metso needs more process variables (i.e. a position sensor 107, a pressure sensor 109 and a sensor for pressure difference 110, Column 4, Lines 58-60.

In Discenzo, the integration time t_0 to t_F is not a cycle time but is time for completing a segment of a process, see paragraph 92. In Metso, the time value is variable and it depends upon the controlled task to be performed as set forth in Column 5, Line 5-21. A time 0 may begin when there is a certain percentage change in the control signal which begins a time counter. The time will be continued until there again is a change in the control signal. Accordingly, the time span for determining information in Metso is arbitrary and unfixed since it is dependent upon a varying control signal. One skilled in the art with knowledge of Metso would not use this method of calculating time in order to integrate and combine with Discenzo in which the time is defined by a complete process segment.

Furthermore, in Metso, the change in the signal is compared to other parameters in order to generate an alert signal. Col. 5, Lines 22-35. There is no integration of this information over a particular time. This is in contrast to Discenzo which is integrating a value over the time of the segment. These are very dissimilar references and one skilled in the art would not be lead to modify the process segment time of Discenzo with an artificial, interval-type definition of time of Metso.

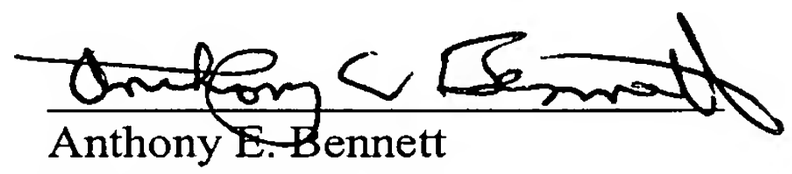
Accordingly, Applicants respectfully submit that Claim 1, as amended and those claims depending therefrom, patentably distinguish over the references of record.

With regard to Claim 14, this claim is directed to a method of determining the service life of a cyclic fluid power system. The claim defines determining a flow rate of a fluid powered system determining the cyclic parameter of the system integrating the flow rate over the cycle time to determine a diagnostic value and comparing the diagnostic value to a predetermined value to determine the operational status of a system. As set forth above, Applicants respectfully submit that neither of the cited references discloses determining a flow rate and cycle time and then integrating the flow rate over the cycle time. Metso clearly does not disclose any integration of a flow rate over time. In addition, Discenzo does not teach a method of determining cycle life of a fluid power system in which a flow rate is integrated over a cycle time. In Discenzo paragraphs 84-90, which have been relied upon by the Examiner, this section is directed to determining optimal performance in order to minimize energy costs. Accordingly, this disclosure is not relevant to determining the cycle life of a cyclic fluid power system. Accordingly, Applicants respectfully submit that Claim 14, and those claims depending therefrom, patentably distinguish over the references above.

With regard to Claim 18, in rejecting these claims, the Examiner has relied on Discenzo including paragraphs 88, 90, 91, and 92. However, these paragraphs are directed to a system optimization in order to minimize energy cost. This process indicates that additional parameters such as expected failure rate and failure costs for different modes may be included in determining the optimization. However, it does not teach calculating failure rates or diagnostic information relating to service life. Accordingly, this reference does not disclose a method for determining the service life of a cyclic system. Metso also fails to disclose any teaching of determining the service life of a cyclic fluid power system based on an integral of the flow rate over a cycle time. Accordingly, Claim 18, and those claims depending therefrom, patentably distinguish over the references of record.

As a result of the amendments and remarks set forth above, Applicants respectfully request favorable consideration of the amended Claims 1, 20 and 28 and the new Claim 31, and allowance of the application with Claims 1, 3-20, 22-27, and 29-31.

Respectfully submitted,



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